author perhaps, but yet is not in a position absolutely to disprove his haphazard assertion, the reviewer would be inclined to believe that a humming-bird could recede from an object without turning, exactly as a humming-bird moth can.

If Mr. Westell had only taken the trouble to prepare an index to his scrap-album, it is possible that some of the quotations from Gätke, Kearton, Bidwell, &c. might have been selected by his readers; but when they have to wade through such stuff as the statement that "Mr. Philip Crawley!," of Croydon, has the largest private collection of birds' eggs, some frivolous nursery rhyme, or a jest from one of the penny comic papers, it is not unnatural that one who desires to learn something about birds should not be attracted thereby.

MISCELLANEOUS.

The Poisons given off by Parasitic Worms in Man and Animals.

By G. H. F. Nuttall.

Many of the symptoms affecting the human subject as well as animals who harbour parasitic worms have been attributed by certain authors to poisons which the latter develop within the body of their host. Peiper, of Greifswald, recently published an article in which he gathered together a good deal of evidence from scattered sources, evidence which very clearly proves that a number of worms do give off poisons.

In the case of the Ascari (familiarly called round or maw-worms), which are found in man, the pig, the cat, and horse, the evidence is very striking. There are a number of cases recorded where children who suffered from convulsions, loss of consciousness, great loss of flesh, anæmia, and other symptoms were promptly and permanently cured of all of these by the use of medicines ("anthelmintics," vulgarly called "worm-medicines"), which removed the parasites from the body. A number of authors have claimed that these parasites were simply injurious through their presence as foreign bodies within the intestine, as well as through their boring, their active movements, and their robbing their host of his proper share of the food he had eaten. That these worms contain some poisonous substance was claimed by Miram, who, whilst studying the *Ascaris megalocephala*, suffered twice from attacks of sneezing, swelling of the eyelids, and excessive secretion of tears, besides severe itching and swelling of the fingers which had been in contact with the worms. Von Linstow noted that when these worms were cut open they gave off a sharp peppery odour and caused tears to flow from his eyes. Inadvertently touching his eye with a finger which had been in contact with these worms, a very severe inflammation of the conjunctiva, with a condition known as chemosis, resulted. Raillet, Arthus, and Chanson had similar experiences. The latter

two observers, working with an ascaris from the horse, suffered in addition from pain in the throat and loss of voice. These experimenters found that 2 cubic centimetres of the fluid taken from the inside of these worms would kill a rabbit.

Kolbe, of Reinez, after having read Peiper's publication above referred to, reported a remarkable case of a child he had unsuccessfully treated with the regular worm-medicines. The boy had suffered for over a year from severe abdominal pains, frequent attacks of fainting, and convulsions. The doctor having been unsuccessful, a friend of the boy's mother—a baker by trade—suggested that he should rub up a dried round-worm with sugar, and make the boy take it. This "homœopathic" remedy had an immediate effect, two tangled masses of worms the size of a fist being given off by the patient, who made a prompt and complete recovery. Cobbold and Davaine have reported cases where various nervous symptoms have subsided on the removal of tapeworms. Marx saw an epilepsy of three years' standing cease on the removal of a *Tænia solium*. It is curious that the eyes are so frequently affected in those suffering from tapeworms. It is quite possible that this is due to the effects of a poison circulating in the blood, the same having been absorbed from the intestine where the parasite is domiciled. In five out of fourteen cases of patients harbouring the tapeworm known as *Tænia nana*, Grassi observed serious symptoms resembling those of epilepsy.

Another worm, the *Bothriocephalus*, may cause severe anæmia, which has variously been explained as due to a peculiar poison, to effects resulting from the *death* of the worm, or to the length of time that the individual has harboured the parasite. A blood-sucking worm, the *Anchylostoma*, which may occur in hundreds, and even thousands, in the intestine, was believed by Lussana to contain a poison, and not to injure its host simply through the loss of blood it entailed. Looss, of Cairo, also states his belief, in a recent publication, that these parasites contain a poison. Working with the larvæ of this worm last summer, he found that even after carefully washing them they caused dogs which had swallowed them to vomit, whereas the water in which the parasites had been washed had no effect on the dogs.

The *Tænia echinococcus*, a tapeworm which in one form of its parasitic life gives rise to the condition called "Hydatid cyst," also gives off a poison, for the fluid taken from the cyst has been shown to be toxic by Debove and Humphrey, who experimented on men and animals. This explains the severe symptoms, and even death, which may follow the puncture of a cyst by the surgeon or its spontaneous rupture. There is also reason to believe that the *Trichina* and other parasitic worms give off poisons. At any rate, we have a fruitful field of investigation open to research along these lines, and there may be a good deal in the home remedy of the baker worm-specialist!—*The American Naturalist*, March 1899, pp. 247–249.

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